



DLR – DAAD Fellowships

Fellowship No. 511

Research Area : Aeronautics

Research Topic: **Extension of DGSEM to nonconforming discretizations with applications to rapid scale-resolving simulations**

DLR Institute: Institute for Aerodynamics and Flow Technology, DLR Braunschweig

Position: Doctoral Fellow

Openings: 1

Job Specification: High-fidelity computational fluid dynamics (CFD) is an essential tool for multidisciplinary analysis and optimization of aircraft and helicopters as well as for detailed aerodynamic analysis of their components. With increasing computer power and improved computational methods at hand, computational studies of parts of air vehicles or simplified complete geometries can now be performed with scale-resolving simulations. To this end, the Discontinuous Galerkin Spectral Element Method (DGSEM) is a promising discretization method, as it combines high-order accuracy, numerical stability and computational efficiency. A baseline implementation of DGSEM with constant polynomial degree on conforming, body-aligned meshes is currently underway in the next generation CFD-code CODA, which is jointly being developed by DLR, ONERA and Airbus. The topic of this PhD position is the extension of this DGSEM implementation to non-conforming discretizations (locally refined hexahedral meshes with hanging nodes, and possibly also spatially varying polynomial degrees leading to hp-refinement) and the combination with immersed boundary conditions on octree-based cartesian meshes to enable rapid scale-resolving simulations .

Required Qualification: DLR looks for a person with experience in the development of CFD methods, preferably in the context of DGSEM and scale-resolving simulations. A substantial knowledge and experience in advanced programming languages (Python, C++) is essential.

Advantageous Skills: Experience in software development in a team is preferred.

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: 01.09.2021

Application Deadline: Until position is filled

Further Information: <http://www.dlr.de>
<http://www.daad.de/dlr>